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~~With the author's regards.~~

THE TREATMENT OF PULMONARY DISEASES BY MEANS OF "PNEUMATIC DIFFERENTIATION."¹

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It is my purpose to speak of a new method of treatment for pulmonary diseases, which was brought to my notice not long since in the Journal of the American Medical Association, February 14, 1885, in which the writer referred to an article in the *New York Medical Record* of January 17, 1885, by Dr. Herbert F. Williams, of Brooklyn, New York, who speaks of the "Antiseptic Treatment of Pulmonary Diseases by means of Pneumatic Differentiation," and records with their results a series of cases which have undergone this method of treatment.

I speak of it as a new method, because I believe it to be a step forward in the treatment of one of the most formidable diseases with which we have to contend, and whatever may be the results of future investigations, I deem it worthy of the careful consideration of all members of the regular profession, and if the results are not what we have been led to hope for, we can, at least, say that no harm has been done by our endeavor to find a new weapon against a terrible disease.

The treatment of pulmonary diseases by the

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inhalation of compressed and rarefied air has been for several years used by well-known scientific men with apparent success in many cases in Europe, especially in Germany, and to a much greater extent than in our own country, where I think I am right in saying that comparatively little attention has been paid to either method by members of the regular profession. Various irregular practitioners have used inventions of their own, having more or less similarity to each other, for the disease in question, but whether from the fact that such people usually keep their inventions to themselves, or because they have been proved to be utterly worthless, no marked movement toward a general adoption of such therapeutic measures has been made.

It has been my good fortune in studying the subject to come across the methods of treatment of one or two irregular practitioners, which at first seemed to resemble closely that adopted by Dr. Williams, but which upon closer examination were found to differ in essential points. Of these methods I shall speak more fully later.

The treatment of pulmonary diseases by means of compressed and rarefied air, as used in Europe, is meant chiefly to accomplish the same result as removal to some different section of the country where the air has the requisite degree of density or rarefaction for the treatment of the disease in question. To obtain this, air-tight compartments are constructed, in which the patient sits for a given time, and the air is then partially exhausted or compressed, according to the needs of the case, which treatment is continued for a certain number of hours in the day for several weeks, or possibly months, and the results seem to justify the fact that

these methods are in constant use in Europe.² Various portable instruments have been devised by different scientific men for inhalation of compressed air, and *vice versa*, the best known being the apparatus of Waldenburg, of Tobold, of Schnitzler, or of Geigel and Meyer; also another of J. Solis-Cohen,³ of Philadelphia, all being modifications of the same idea, illustrations of which I shall show you to-night, as seen in books upon the subject. It will be noticed that in the use of these last-mentioned instruments the surface of the body is exposed to the ordinary atmospheric pressure, whereas in the case of the pneumatic chambers the atmospheric pressure upon the body and in the lungs is increased or diminished according as the air in the cabinet is compressed or rarefied.

Still another method has been invented by Hauke, called by him the "Wanne," or tub, spoken of in Ziemssen's *Handbuch der allgemeinen Therapie*; but, as far as I can discover, the apparatus has not been universally used. In following out this method, a rubber hood, closely fitting about the head and leaving the face only exposed, comes down over the shoulders like a shirt. The patient is then made to lie down in the "Wanne," which in shape resembles a tub, having a close-fitting rubber cover which encircles the neck of the patient, and the hood is then fastened to the edge of the cover by means of an elastic band. The air is then par-

² Compartments of this nature exist in Lyons, Montpellier, Nice, Stockholm, London, and St. Petersburg, also in several places in Germany, but I am not aware that any similar chambers are constructed in this country. They are expensive and need the care of experienced persons in the regulation of the various devices used in connection with them, and it is probably for this reason that they are not more universally used.

³ Solis-Cohen's article in *New York Medical Journal* for October 18, 1884, entitled "Compressed and Rarefied Air as a Substitute for Change of Climate."

tially exhausted from the interior of the "Wanne," which decreases the atmospheric pressure over the surface of the body, with the exception of the face. Upon inspiration the increased pressure of the outside atmosphere materially tends to expand the lungs from within, and the inspiratory act is greatly facilitated, whereas the expiratory effort is proportionately increased, and a calisthenic action of the lungs and chest-walls is thereby obtained to a greater degree than by the ordinary respiratory movements.

A similar method to this was adopted by an irregular practitioner, called "The Hadfield Body Receiver for the New Haven Vacuum Cure," used, I have been informed, in 1869, a sketch of which I have with me.

I have mentioned quite superficially the various methods used by the regular profession in so-called pneumatic therapeutics, so far as I have been able to learn of them, that you may be able to understand the general principles of their use, and before speaking of Dr. Williams's cabinet it is only necessary to mention the various methods of inhalation familiar to us all, used all over the world in the treatment of pulmonary diseases; for example, inhalations of atomized sprays of different substances, of the use of rooms filled with medicated vapors, etc., all of them seeming to have met with more or less success, but too numerous to do more than mention here as they bear upon Dr. Williams's method of treatment.

In March, feeling much interested in what I had read of the Pneumatic Cabinet, I went to Brooklyn and was there enabled, through the courtesy of Dr. Williams, to study the apparatus thoroughly, and to examine three or four of his cases who had de-

rived marked benefit from the use of the so-called differentiator. The cabinet is made of iron and resembles a large iron safe in general shape, in one end of which is a large, thick glass window. It is between six and seven feet high, about three feet wide, and from three and one-half to four feet long; in short, large enough for a man or woman to stand up or sit down in comfortably. Opposite the window is a heavy iron door edged with rubber and furnished with heavy bolts, all moved easily by one handle, so that the door can be instantly opened. Beneath the window is a projection in the side of the cabinet to accommodate the patient's knees when sitting with the face near the window, the same projection serving on the outside as a shelf upon which the atomizer used with the apparatus is placed. Passing through the glass window is fixed a short gutta-percha tube about one and one-half inches in diameter, having a stop-cock on the outside, and ending in a trumpet-shaped opening for receiving the spray, the inner end being fitted with a movable rubber tube and mouthpiece for the patient's use. Near the cabinet stands a cylindrical iron vessel, from which the air is as nearly as possible exhausted, communicating with the interior of the cabinet by means of a pipe and stop-cock. A barometer, connected with the inside of the cabinet to show the amount of rarefaction of air in the interior, is fastened to the outside of the cabinet.

The patient enters the apparatus and seats himself opposite the window; the door is closed and the stop-cock of the pipe connected with the vacuum is opened. The air from the cabinet rushes to the vacuum, and when the barometer shows a depression of two tenths of an inch the stop-cock is again closed. A spray, usually of carbolic acid, iodine, iodoform, or bichloride of mercury, either singly or

in combination with each other, is then put in front of the inhaling-pipe; the patient is directed to insert the end of the tube in his mouth, closing the lips over the mouthpiece, at the same time compressing the nostrils with his fingers to prevent the air rushing out through his nose; the stop-cock is turned and the outside air rushes in, carrying with it the medicated spray and causing a more forcible involuntary inspiration, giving one the sensation of having taken an unusually full, deep inspiration; the patient then, by a voluntary forced expiration, exhales through the tube again, and continues these respiratory movements several times. Upon the least feeling of fatigue the stop-cock is turned and the patient, after removing the tube from his mouth, breathes the rarefied air of the cabinet again until ready for a second trial. The time occupied in this treatment varies from ten to thirty minutes, and usually daily applications are made, the greatest number given, according to Dr. Williams's pamphlet, being one hundred and thirty-five. The amount of rarefaction used in the beginning is never more than what would cause one tenth or two tenths of an inch depression of the mercury, but during the treatment a gradual increase of rarefaction may be used, up to an amount causing a one-inch depression of the mercury, although in many cases, doubtless, even a greater degree of rarefaction could be used with benefit and without evil results.

The only peculiar sensation which may be noticed in the beginning of the treatment is a slight crackling in the ears, as the air is being exhausted from the cabinet, but if the patient be told to swallow two or three times, this symptom will entirely disappear.

It will be seen, I think, from the foregoing descrip-

tion of the apparatus, that what it accomplishes is twofold in its nature, namely : it produces a much greater expansion of the lungs than is possible by an ordinary full inspiration ; and, at the same time, the medicated spray being carried with much greater force than by a natural inspiration is deposited in the deeper portions of the lungs in a much more thorough manner than by any other method that I know of, as has been proved satisfactorily by Dr. Williams in a series of experiments referred to in his pamphlet.

As to the principle of his cabinet, it will be noticed that it resembles in theory the "Wanne," or tub, of Hauke, before mentioned, in which atmospheric pressure on the surface of the body is lessened, the face only being exposed to the outside air ; but the simplicity of Dr. Williams's method, by which the patient is enabled to undergo the process without the discomfort of putting on extra coverings, as in Hauke's plan, will strike every one, to say nothing of the greater thoroughness with which the purpose is accomplished. The chief merit of his cabinet lies, however, in the fact of the *combination* of the medicated spray with the increased strength of the inspiratory movements. For full accounts of his cases which have undergone this treatment I must refer you to his pamphlet, merely remarking that the percentage of cases which have improved is most gratifyingly large and that it must be left to the future to determine whether others meet with equally happy results. I wish to speak, however, of three patients whom Dr. Williams kindly let me examine. [Cases I., II., and IV., were read from Dr. Williams's pamphlet.]

Upon examination of case II. of Dr. Williams's

pamphlet, I found him to be a young man of rather delicate build, but otherwise looking well, and to all outward appearances in good health. Percussion of the right chest showed slight dulness in that region, and upon auscultation a faint crumple was heard, and the respiratory murmur was harsh, but the gurgling sound and the amphoric quality spoken of at the first examination I did not get. The young man spoke of himself as feeling all right, but upon closely questioning him I found that he had a slight cough upon arising in the morning. Of the evident marked improvement from his previous condition as described no one would doubt, as he had been enabled to resume his work a year previous.

CASE I. (a young lady), when I saw her, looked rather pale and anæmic, but her mother spoke to me especially of the condition in which her daughter was before beginning the treatment, and of her belief that she was well. Examination of right chest showed dulness and crumpling with inspiration, — a marked difference from the signs noticed before, — and the patient was able to do, as far as I could learn, everything that the other members of the family were accustomed to.

CASE IV., which was complicated with empyema, looked perfectly well, showing a slight fistula in the left chest. Upon examination, all the signs of a former empyema on the left side were present. Dr. Williams also spoke of the presence of a slight crumple heard at one time under the right clavicle in the course of the disease, but after the continued use of the cabinet it disappeared, and when I examined him the respiration was absolutely pure at that point.

In regard to the first two cases it should be said that Dr. Williams does not wish to claim that they are insured against a return of the trouble: on the

contrary, he believes that they both will eventually die of phthisis ; but he does claim the greatest improvement and an arrest of the disease, and, as far as outward appearances are concerned, a return to health. He hopes for the greatest benefit to arise in those cases of incipient phthisis where there seems to be nothing more than a catarrhal condition of the lung, and his one desire is that his method of practice shall be given a fair trial by members of the regular profession everywhere. In those cases, moreover, of a slowly expanding lung after pleuritic effusion, the mere mechanical treatment of the cabinet can be of great assistance in promoting expansion.

In every collection of cases of this sort it is only right that we should carefully weigh every evidence for and against the justice of the conclusions drawn. In the cases enumerated in Dr. Williams's pamphlet we must think of the moral effect of the new method upon the patient. No doctor is unaware of the marvelous influence which the mind has over the body, and of the marked improvement which often takes place in the general condition of a patient upon trying a new physician or a new method of treatment. We must think, moreover, of the possibility of the enthusiasm of the inventor blinding his eyes to certain facts which must be considered, while wishing at the same time to be perfectly fair and unbiased in his statements ; we must also not be too greatly influenced by the delight of friends and relatives, who, seeing a marked improvement in one dear to them, exaggerate to themselves the signs of a return to health. Nevertheless, with a collection of cases such as Dr. Williams gives us in his pamphlet, it becomes the duty of responsible physicians throughout the country to investigate the subject thoroughly in a spirit of perfect fairness and

without prejudice, and to let the future decide whether others meet with equally successful results.

It has been my desire since seeing Dr. Williams's cabinet to find if any similar method of practice has been used before; and my attention was called to a cabinet used by a practitioner not of the regular profession in this city. In a pamphlet issued by him, a woodcut of his cabinet was shown which seemed to resemble almost precisely in principle that of Dr. Williams; and the description of its use as expressed in the pamphlet led me at first to believe that they were identical, with the exception that no attempt was made to use a spray in connection with the cabinet. I visited the gentleman and was received with courtesy, and the principles of the cabinet were explained to me. The description of the apparatus in the pamphlet speaks of the air being partly exhausted about the patient at his will. Upon questioning the gentlemen more closely, however, I found that the breathing-tube and stop-cock on the inside of the cabinet were not used at all in the same manner as in Dr. Williams's apparatus; and I cannot do better than quote the gentleman's words as nearly as possible: "I exhaust the air in the cabinet to an amount causing a pressure on the outside of the cabinet of about three to five pounds to the square inch (an equivalent of a depression of six to ten inches of the mercury), and direct the patient if he become nervous to open the stop-cock *very slightly*, so that the outside air may enter enough to reassure him, and then let him sit in the rarefied air for a certain length of time, and at the end of the sitting make him take one or two deep inspirations to expand his lungs, opening the stop-cock a little at the same time, the end being in the mouth." From this description it will be seen that

his method resembles more those previously spoken of, in which the patient merely sits in a rarefied atmosphere for a given time. No attempt is made to breathe in and out as in Dr. Williams's cabinet; indeed, this would be impossible with the great amount of rarefaction used, for the force of air rushing in through the wide open stop-cock would severely injure the patient; moreover, as I said before, no attempt is made to combine the spray with his apparatus. So it will be seen how essentially the two methods differ at the outset, to say nothing of the fact that while in the one case we are dealing with a scientifically educated physician, in the other we come in contact with one who professes to "diagnositicate his case by his eye"; who "never auscults nor percusses his patients nowadays," and who "draws the corruption out through the skin," etc. etc.

I have endeavored to give the important facts relating to Dr. Williams's apparatus, and to show how it differs from other methods of treatment as far as I have been able to learn of them by reading or by personal observation. My object will be accomplished if the paper shall excite discussion; and I trust if there is any one present who knows of methods of treatment resembling those of which I have spoken, he will speak of them to the Society this evening.

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